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UNITED STATES DEPARTMENT OF AGRICULTURE  
FARM SECURITY ADMINISTRATION

REGION I BULLETIN #54

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FARM FORESTRY

IN

THE FARM SECURITY ADMINISTRATION PROGRAM

Region I

Northeastern States

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U. S. Department of Agriculture

Prepared by A. L. Richey  
Regional Forestry Consultant

Upper Darby, Pennsylvania  
June, 1942

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#### ACKNOWLEDGMENT

The tree volume tables on pages 20, 21, and 22 are taken from United States Department of Agriculture Bulletin No. 1210 "Measuring and Marketing Farm Timber."

The growth calculation table on page 24 and the record from on page 33 are reprinted by permission from "Forestry in Farm Management by Westveld and Peck, published by John Wiley and Sons, Inc. This book was used generally as a reference in the preparation of this bulletin.

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## FOREWORD

One of the most valuable of lessons to be learned by farmers, farm management people and public leaders is that the farm woodland is an important part of the farm -- rather than an unrelated attachment.

A few hours spent with "Farm Forestry" will give one a working knowledge of the value of the "crop" produced by the woodland, the extra income that can be earned by taking care of the crop, and how it can be managed to best advantage as a part of the operation of the farm.

With this knowledge farmers and Farm Security Administration people can direct their efforts on woodland management in such a way that the most good will accrue to the farmer and to the Nation, not only during the war, but for so long as we can imagine.

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## PART I

### FORESTS AND THE FARM

Farms and woodlands have always been closely related in the agriculture of most countries. In former times forests were generally looked at as obstacles to pioneer farming. Although they provided the wood with which to build shelters and make tools they were usually found on the most fertile and valuable agricultural land and had to be cut and burned before the land could be cultivated. The very abundance of the forest prevented it from having any great value, as any farmer could get all the wood he needed without cost. Now, since so much of our forest land has been cleared, cut over or burned by forest fires, the part played by woodlands in farm operations is almost entirely to the good and is often of very great importance.



The Forests Were Cut and Burned  
To Clear the Land For Farming.

### Income from the Farm Woodland

In comparison with the gross cash income from cultivated crops and pasture (averages \$18.50 per acre in the Northeastern states) the average cash return from woodlands might not seem to you to be very large. However, there are some facts not always thought of in figuring these returns which put the growing of forest products in a much more favorable light.

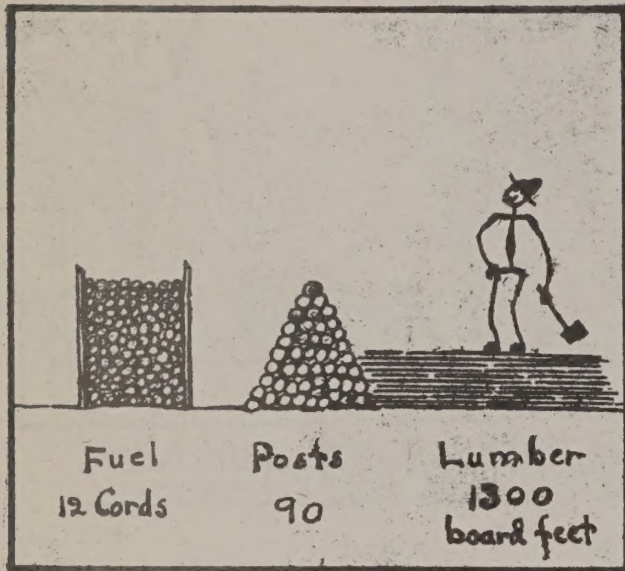
1. The amount of forest products you now obtain from your farm may be only a fraction of the return which you can get by managing and protecting your woodland.
2. The income from the farm woodland is mostly "net"; whereas income from other crops usually requires heavy expense for seed, fertilizer, etc.
3. The income from farm woodlands usually comes from those parts of the farm which must be operated at a loss if put to other crops; that is, from rocky hillsides, steep slopes, extremely wet, droughty, infertile or worn out soils.
4. The improvement or harvesting of the farm forest can usually be done in slack seasons or during bad weather when productive work cannot be done on other crops.

It is easily possible to raise the present average yearly return of only 5 to 25 cents an acre to from 50 cents to \$2 per acre. Of this about 25% will be farm labor. It is possible, in certain very favorable locations where high quality hardwoods (oak, maple, ash, tulip, poplar,

etc.) of rapid growth may be produced to get an income of as much as \$6 per acre per year.

### Materials Supplied

<u>Product</u>	<u>Quantity needed</u> <u>each year</u>	<u>Value as</u> <u>Stumpage</u>	<u>Value if Purchased</u>
Fuel wood	12 cords	\$18.00	\$60.00
Fence posts	90 posts	6.30	31.50
Lumber (rough)	1300 bd. ft.	9.10	45.50
		<u>\$33.40</u>	<u>\$137.00</u>



Large quantities of wood products of all kinds are grown on farm woodlands for the market but you may find that your woodland is of greater value to you from year to year in furnishing material needed on the farm.

### Forests Provide Protection

In addition to the cash from sales and the material for home use supplied by the farm woodland, there are a number of other important values which are often taken for granted.

### The Average Farm Needs Each Year (12 cords - 90 posts - 1300 bd.ft.)

perfect cover and can be grown on many kinds of poor eroded soils which will not support other kinds of plants.

1. Protection against soil erosion is probably the best known of the protective uses of the forest. Trees make an almost perfect cover and can be grown on many kinds of poor eroded soils which will not support other kinds of plants.
2. Protection from excessive rain run-off and loss of soil moisture is closely connected with prevention of erosion damage. The farm woodland can often help greatly in keeping a dependable flow of water in streams, springs and wells.
3. Protection of farm crops and buildings against damage from high winds and from the bad effects on stock, crop growth, and human comfort from hot, dry or cold winds.
4. Protection to human beings and animals in supplying shade.

### Other Values

Woodlands give still further benefits to your farm and your family. These are not often thought of and would usually be recognized as important only if they should be lost.

1. Recreation value of the farm woodland for picnicking and hunting.
2. Food and shelter for game birds and animals, many of which destroy large quantities of insects feeding on farm crops.

3. Food products for the family (and often for sale) such as walnuts, hickory nuts, maple sugar, berries, etc.
4. Increase in soil fertility coming from the decay of leaves twigs, and other forest litter.
5. Increased value of the farm as a result of having a fast growing, well cared for woodland or sugar bush.

### Protection

Protection of farm woodlands from damage by fire is the first thing necessary to good management. It is at present the field of farm forestry in which most progress has been made.

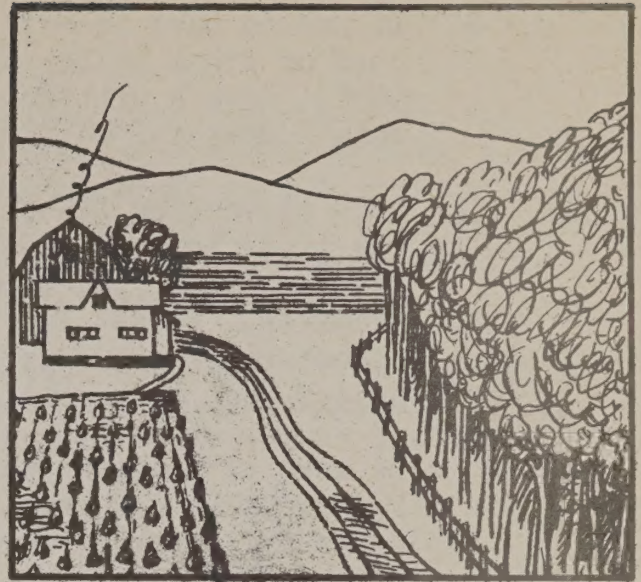
Protection of the farm woodland from overgrazing is necessary if you are to have a good woodland. In many places grazing stock in the woods does far more damage than fire. It is seldom if ever possible to get a good yield of both wood and forage from the same area - it is better to decide upon the best use of the area, then put it as efficiently as possible to that use.

Diseases and insects prey on trees the same as on other crops and must be prevented or controlled. This is usually done in the course of improvement work or harvesting. The infected materials are removed or destroyed thus reducing the spread of the disease or infestation. For some diseases, the blister rust on white pine, for example, special control measures are necessary. Farmers should be able to recognize the presence of the common diseases and insect attacks in order to act promptly and successfully in the protection of their woodlands.

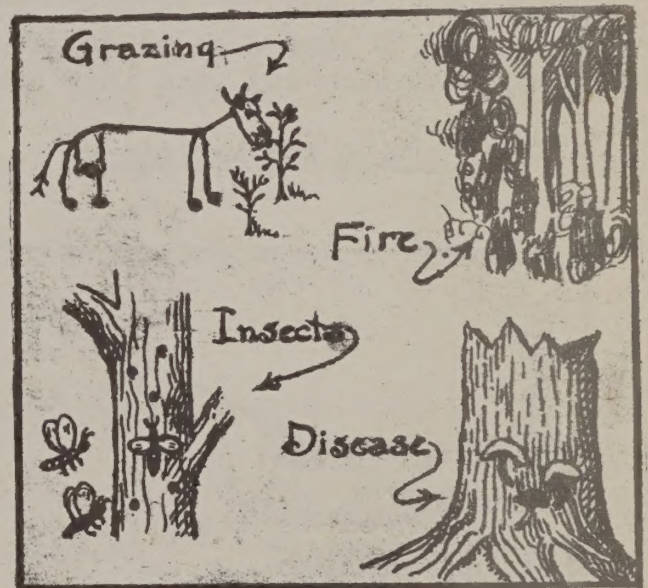
### Managing Your Farm Woodland

Good management of a farm woods takes only common sense and a little patience. If you observe these general rules you will be well repaid in the amount and quality of wood which you can grow.

1. If possible cut your forest products with your own labor or your hired labor. This makes it possible to sell your labor as well as your stumpage and to cut your woodland exactly as you want it cut.



A Productive Woodland Adds  
To The Value Of the Farm

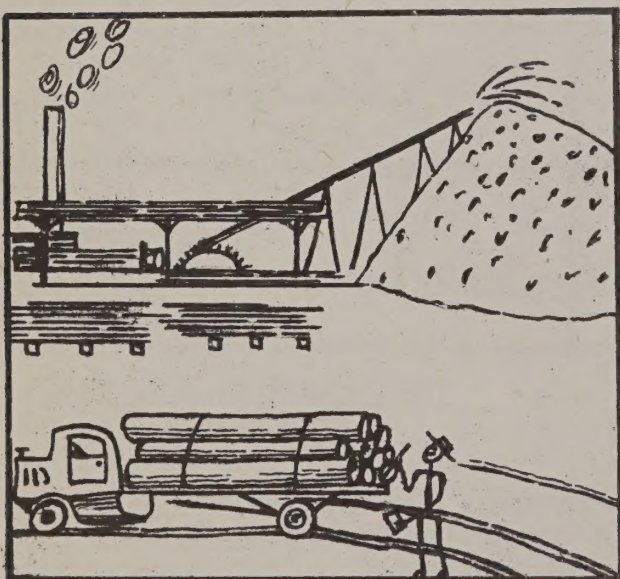


The Farm Woodland Needs  
Protection

2. If you do have to sell standing timber sell by the board foot, cord or other unit. Avoid selling "by the lot" or for a "lump sum". Have a written agreement with the buyer setting down in detail what you permit him to cut.
3. When harvesting timber leave enough of the best and fastest growing trees to give another cut on the same area in from 10 to 20 years or after the trees left have grown another 2 to 4 inches in diameter. Do not cut for saw timber hardwoods less than 18" in diameter or softwoods less than 14" in diameter (on the stump) unless such trees are crooked or contain defect.
4. Be sure to leave enough large size timber to furnish lumber for farm repairs and construction. Get your fuel, posts and other needs by thinning your younger timber and by working up tops and slash after logging.
5. You may need to do special work from time to time, such as improvement cuttings or planting to get the best yield from the woodland.

Over-cutting and unwise management often create farm woodland conditions similar to those of a field crop in which the largest and most vigorous plants have been removed before they became mature, leaving a thin stand of weed choked and inferior stalks. Many woodlands are producing only a third or a half of the wood value possible if the forest were weeded, improved and carefully cut. Some farmers do not give their woodlands the attention they need because of lack of interest. When they see the opportunities for profits they will often proceed at once to give their woodland the same attention and care they give their other crops.

#### Production and Marketing



Good Markets at Fair Prices  
For Well Made Forest Products

The instances are many where farmers have given cutting rights to their woodland to hard bargaining buyers for a fraction of their worth, simply because they did not have exact knowledge of the material they were selling, or allowed the buyer to cut the timber just as he wished without regard for keeping the woodland productive.

It is not hard to learn how to estimate the value of the trees in your woods. This is explained further on. You may find it well at the start to get the help of a forester or lumberman to advise you, since years of protection and care may be lost in a few minutes by a poorly advised sales agreement.

### What You Can Do

Our country is now at war. Farmers have a most important job in producing the foods and fibers we must have for our country and her allies to win. The farmers in the northeastern states will, in addition to food, produce large quantities of lumber, pulpwood and other products from their woodlands. But we must cut the woods sensibly for we will have need of wood in years to come as we have before and do now.

We can cut all the wood we need and still leave enough young trees or "growing stock" for future years without giving up very much, if any, income. Foresters and millmen both know that much small timber cannot be cut or manufactured at a profit.

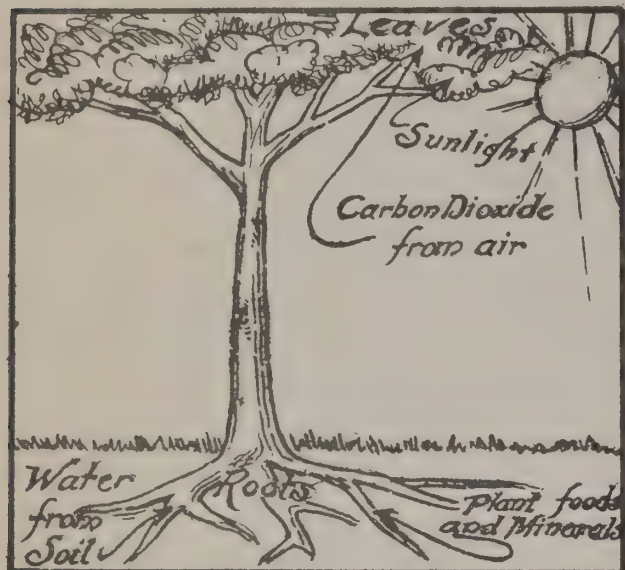
Farm Security borrowers may be in better position than most to make woodland management an important part of their farm and home planning. They know that good management pays - in the woods as well as in the fields or in the dairy barn. It is hoped that they will help "show the way" so that other farmers in their neighborhood will see and follow their good practices. If every neighborhood does this the United States will always have wood - good wood and plenty of it!

If you need help or information get in touch with your Farm Security Supervisor or your County Agent. They are there to help you and if they can't give you all the help you need they will put you in touch with someone who can. Before he comes read the pages which follow. In them you will find the answer to many of your questions.

## PART II

### HOW FORESTS GROW

Trees live and grow upon water and foods taken from the soil by the roots, carbon dioxide taken from the air by the leaves and sunlight.



#### Trees are Plants and Need The Same Things to Live and Grow

Trees reproduce themselves like other plants by means of seed, sprouts or suckers.

The wood substance is built right under the bark and is laid down upon the trunk and lumbs of the tree very much like many coats of paint. Most trees produce wood in the spring of the year which is lighter in color and has a different appearance than the summer wood. When the trunk of a tree is cut across this gives the appearance of a number of rings inside one another and spreading out from the center. These are known as "growth rings", and since one is added every year we may, by counting them on the stump, learn how old the tree is.

There are many, many kinds or species of trees (about 1100 in the U.S.) Each has its own form, habits and needs. The different trees vary also as to the value of their wood and the uses to which it can be put. One of the first things the farmer must do, therefore, is to be able to know all the important kinds of trees in his woodland. Nearly every state issues a tree manual which will be of much help and interest even to those who know trees well by their common names. These manuals can be gotten from the State Forester or Extension Forester.

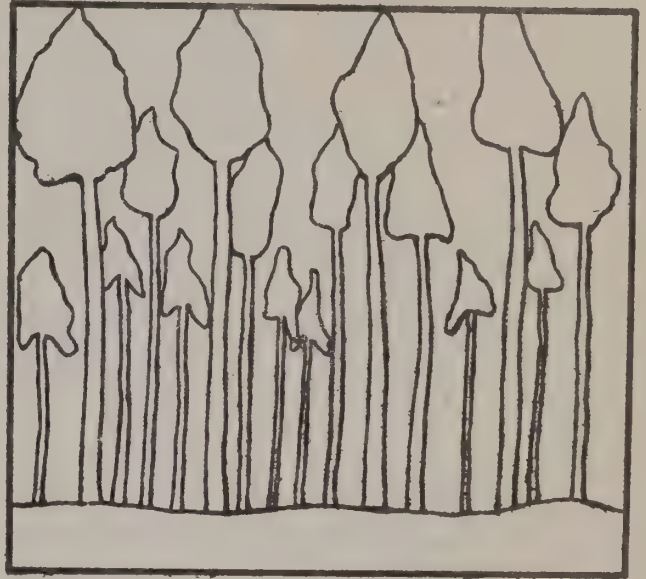
You should remember that although a certain kind of tree may grow on a certain spot, this does not show that the tree prefers that spot or that it grows well there. It simply shows that that kind of tree can grow on that particular soil where other trees cannot. It should be remembered, too, that erosion may greatly change a soil and that trees which did well on the area before the soil washed away may not do well or even live at all after erosion.

As with other crops you must build up and keep a good soil condition if a good yield is to be had. You cannot apply fertilizer to forests which are grown for the wood alone because of expense. You must depend chiefly on conserving the forest litter, the dead leaves and branches and other rubbish which collects naturally on the forest floor. Such litter improves the soil. It also protects the soil against erosion. Protection from fire and grazing, together with the right cutting methods, are necessary to build up and keep soil fertility.

The forest grows best when it is fully stocked with healthy, rapid growing trees and is protected from fire, insects and disease. The timber crop, like any other, is measured by its quality and quantity. The end

for you to seek, therefore, is a full stand of high quality trees. It so happens that the quality of timber is affected greatly by how close together the trees grow. High quality timber must have a stem free from limbs, which are the cause of knots. It must be tall and should not have much taper.

In dense, but not overstocked stands, the trees compete with each other for sunlight and grow tall and straight. In a good forest the largest trees should be so crowded that the crown or top of each tree is nearly in contact with those of its nearest neighbors. If the crowns touch or are so dense as to be poor and spindly the growth rate will be low. In such a case thinning would be needed. It is most important, however, for you to keep a well stocked woodland, not only to get the most wood from the soil, but to get clear high quality wood. Logs of first quality bring 2 to 3 times the price paid for logs of poor quality. Clear straight trees are necessary to make piling, poles and other high value piece products.



Trees in a Dense Properly  
Stocked Stand Grow Tall and  
Straight

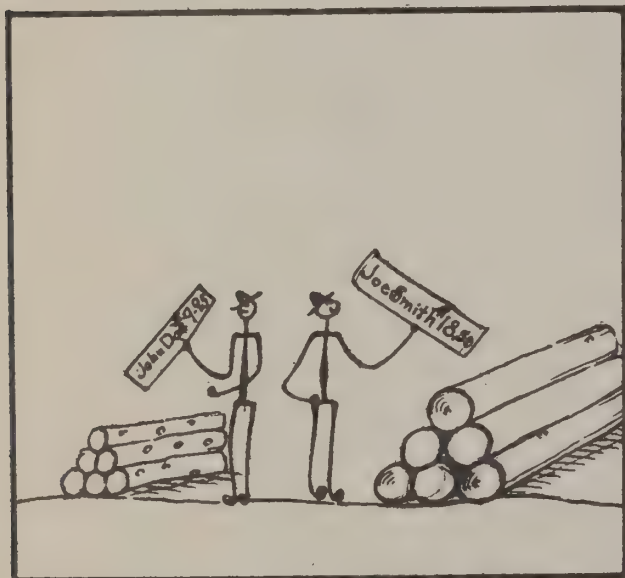
### PART III

## IMPROVING AND HARVESTING THE FARM WOODLAND

### General

The management of the farm woodland must be built on the idea of continuous production of the largest quantity of high quality wood which the area will grow at a profit. This means not just for 2 or 5 or 10 years but indefinitely into the future. We have seen before that a heavy stocking of trees must be kept at all times if quality material is to be produced. If this "growing stock" is reduced by over-cutting both quality and quantity growth is lost and years are needed to bring them back. In growing timber for sawlogs you will do well not to cut trees as soon as they become large enough to make logs which can be sold. Such trees are just coming to the point where they are beginning to make good growth.

Here is an example which shows how this works: In the upland oak forest of the Northeast it takes 40 years to grow a stand of mixed hardwood to an average size of 12 inches at breast height (4 1/2 feet from the ground). At this age the trees are just barely saleable at a mill and there will be about 2,500 board feet to the acre which is the least a logger could afford to go into the stand to get. The logs will be all low quality, will have much sapwood and will bring a low price.



It Does Not Pay to Cut Small  
Timber for Sawlogs.

However, if this same timber is allowed to grow another 40 years we now find that the trees average 20 inches at breast height but the volume per acre will be 19,700 board feet or an increase of about 8 times in only twice the age. But in addition most of the logs will now be of high quality and will bring a good price on the market. By waiting until the timber was fully grown the owner's income can be increased from 12 to 15 times.

One of the first questions you may ask when you think of managing your forest is, "what kinds of trees should I grow?" It is best to consider only those trees which can do well in your woods. Some study and comparisons with other woodlots will be of help here. In cutting you will want to favor those kinds of trees which show the most promise and, in general, those will be the kinds which are growing the largest amount of wood. This can be learned by looking at a number of cross sections of trees already cut or carefully notching a few trees with a sharp axe so that the rings for the last inch or so may be seen.

Other things being equal we know that some kinds of wood bring better prices on the market than others. For instance, white pine, white oak, yellow poplar, black walnut and ash are of greater value than scrub pine, black oak, beech, sycamore or red gum. We may expect this to continue, although there have been many cases where trees once thought valueless have

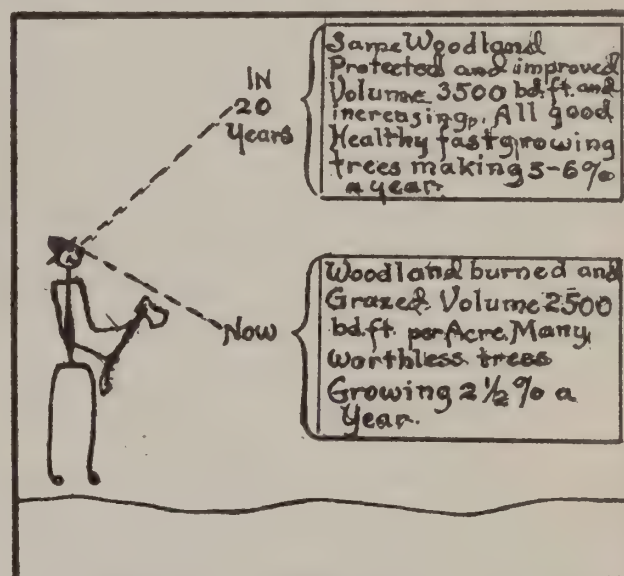
acquired very good value on the market. Therefore, trees which are growing well, are of good form and health and are well suited to the soil and climate should be favored in the cutting, whether it is done for improvement or for harvest.

### Improving the Farm Woodland

The average woodland is often given over to poorer kinds of trees, or to trees ill-formed or diseased. These may be crowding or overtopping the few good trees which may be present. Grazing or fire may have damaged the older trees so that they are no longer paying their way.

In defining the science of forestry it has been said, "Forestry consists of nothing more than a sharp axe and an eye to the future". There is much truth in the statement, for with the axe or the saw we do away with the trees we do not want, to favor those which are or will be more valuable.

Farm woodlands are in general of two quite distinct kinds. The first we may call the young or immature forest, which consists, as the name indicates, of young trees not yet of merchantable size. The plan for the young forest is to bring to full growth the greatest number of high quality trees in the shortest time. The second we will call the mature forest. This type has enough large trees to offer an economic logging chance. Our problem here is to harvest these mature or full growth trees in such a way that new young trees of the kinds wanted will rapidly take their place.



"Forestry - A Sharp Axe And An Eye to The Future"

Young trees are usually spoken of as seedlings, saplings, or poles. Seedlings vary in size from less than an inch to perhaps 8 to 10 feet; saplings range from this height to around 25 or 30 feet and will have a diameter of 4 1/2 to 5 inches; and poles are trees of greater diameter than this but not yet merchantable. Trees which have grown to a diameter of 10 inches or more are spoken of as mature, but if they are still growing rapidly and putting on so much growth that they should be left standing instead of being cut, they are termed "thrifty". It is not well, particularly in cutting for sawtimber, to consider removing the trees until they are much larger than this and the trees are fully mature and growth rate has become low.

### Improvement Cuttings

Here are several kinds of cuttings which you might make in improving your woodland. Study them and see which will apply to your woodland.

Any cutting which removes some of the trees in the stand for the benefit of those remaining is called an improvement cutting. When the cutting is made in stands of seedlings or small saplings we call it a cleaning; if made in somewhat older or pole stands it is called a thinning;

and when the cut removes scattered old trees of low value which are overtopping and holding back good young trees it is known as liberation cutting.

### Other Improvement Cuttings

Betterment Cutting is a special type of thinning, it is made in thrifty stands containing saleable trees for the purpose of removing useable trees of poor form or slow growth from competition with better trees.

Salvage Cuttings are made in woodlands which have been injured by fire, sleet, windstorm, etc. The useable material is salvaged before it decays or becomes further damaged.

Sanitation Cuttings are made when trees are harboring diseases or insect pests and must be removed to prevent their spread. The material may or may not be saleable.

Vine Cutting. Ivy, honeysuckle, grape and woodbine frequently do considerable damage to trees by twisting about the trunks and branches, shading out the leaves and bearing the trees down by their weight. They can be cut at no great expense.

### Cleanings (See definition above)

Cleanings are merely the weeding out of the poorer kinds of trees, or the crooked or damaged trees where these are interfering with the better ones. You can often do a very good job by lopping the tops of the poor trees rather than cutting them near the ground. In order to decrease cost and avoid over-cutting, only those poor trees which are actually interfering with the better ones should be removed. The material cut generally has no sale or other material value and the reason for the cutting lies in helping the trees which are left.

### Thinnings

Young stands of timber often become so crowded at some stage of life, that the cutting of some of the trees is needed in order that those left may continue to grow rapidly and well. This is much the same as thinning or blocking of truck crops where, in order to secure the best growth of some, the others must be sacrificed.

Thinnings are usually made in large sapling or pole sized timber. Larger trees generally do not show much response in the way of increased growth. It is good practice, where it can be done, not to thin until the product can be sold and is of sufficient size and value to pay for the operation or at least a part of it. Thinning may be repeated as often as needed or whenever the wood cut is sufficient to pay for the operation.

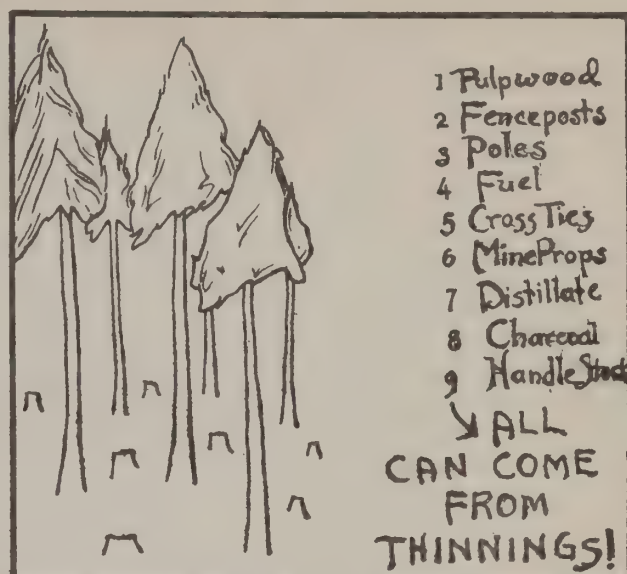
In general, in a thinning operation you should remove the trees having the least value in the final crop. Those that remain should be those of the best form, the most rapid growing, and those which show the most promise of having the highest final market value. You should cut, therefore, the dead or dying trees, the least valuable and the slowest growing trees, and those which are damaged by insects or disease.

After the thinning is done the spaces between the crowns of neighbor-

boring trees should not be so large that they will not close again within 3 to 5 years. Generally not more than one-fifth to one-fourth of the trees should be removed at any one time.

The income you can expect from a thinning will vary a great deal and usually depends upon a special market. Where fuel wood only is secured you can get back your cash costs and often a little more. On the other hand where pulpwood, handle stock, posts, poles or ties can be cut, a handsome income may often be obtained.

You should not hesitate to thin a woods which shows no profit or even a light expense provided the woodland is capable of growing good timber at a fair rate. If the job is well done the return in increased growth in the remaining trees will more than pay for the operation.



Thinnings Can Be Profitable

### Liberation Cutting

Many woodlands, especially those which have been culled or "high graded" for many years for the better trees have numbers of scattered old trees which are overtopping and shading valuable young growth. These old trees may have been missed or passed up by the logger because they were of poor form or the wrong kind. They may have been the first trees to come in after fire or logging, and have formed low, branchy, wide spreading trees of little value. Such trees (sometimes called wolf trees) occupy growing space which ought to be used by trees of better form and able to put on valuable growth. It is best to remove such old trees at the earliest opportunity. They usually make good fuel and can often be used to advantage in this way. Where they cannot be used at all they may be allowed to lie where they fall or may be killed by girdling and left standing.



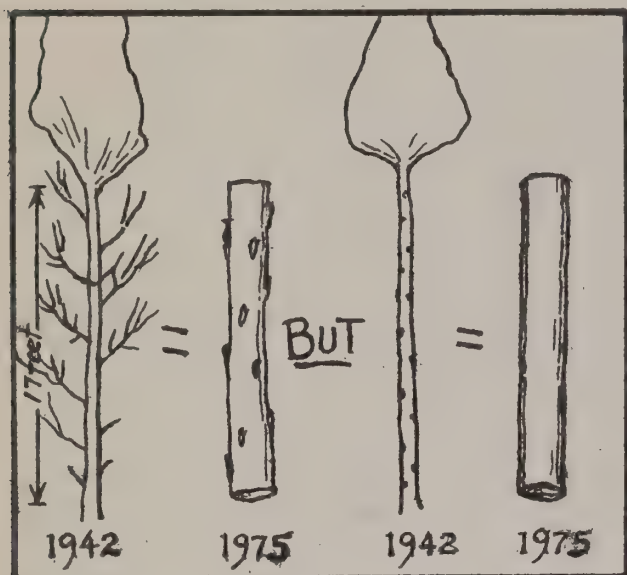
"Wolf Trees"

Occasionally these old "wolf trees" are the remnants of a former virgin stand and they may be of a kind which was not saleable at the time. Such trees, swamp white oak, for example, may now have a very high value and it is good practice to cut them for sale before they become over-mature and liable to rot.

### Pruning

Pruning is the removal of the limbs from the lower part of the stem

of the tree. This makes it possible for the tree to put on wood growth which will be clear, free from knots and more valuable. Pruning is not necessary in all timber but for some kinds, particularly white pine, it is usually very desirable. Many trees do not shed limbs readily and after the lower limbs die they are often slow in falling off. As long as the limb is attached to the stem only wood of low quality for lumber can be produced.



Pruning Makes Clear, Valuable  
Logs and Lumber

Only trees which are to be grown to full sawlog size should be pruned. Since the pruning must be done when the trees are of small pole size (4 inches-8 inches at breast height) it is frequently very hard to tell which ones may be the final crop of perhaps 75 to 80 trees. It is well, therefore, to prune from 100 to 200 of the best formed and most rapidly growing trees per acre. These are pruned to a height of from 17 to 20 feet. This may need to be done in two or three operations, since it is not good to remove more than 2 or 3 whorls of living branches at one time.

Pruning which removes live limbs should be done during the winter season when the tree is dormant; but dead limbs may be cut at any time. Since large wounds are likely to become infected with rot, it is good practice to prune only limbs which are less than 2 inches in diameter.

The limb must be cut close to the stem without injuring the bark. No stub should be left. The tools needed are the ordinary pruning saw or pruning shears which many farmers are likely to have on hand. A ladder will be helpful. A pole saw such as orchardists use is an excellent tool. The saw should have 5 to 7 teeth per inch and works best if it cuts only on the back stroke. An axe should never be used for pruning. It injures the bark and leaves stubs or pitch pockets.

#### How to Select Trees for Cutting in a Young Stand

In deciding whether trees are to be cut or kept to grow you must make certain decisions. In the individual tree look at its present and future value, its ability to put on good growth, its soil and water requirements and its wind firmness. If each tree is checked over carefully on the basis of these questions the woods after cutting should be in a very good condition.

1. Is the tree sound and of good form?
2. Which would be better for the growing condition of the stand as a whole, to cut or keep this tree?
3. Would keeping or cutting the tree now result in the greatest financial return from the woodland in the long run?

## Harvest Cutting

Cutting in mature or full grown forests not only produces the crop for sale or use, but of equal importance, it provides for the re-seeding or sprouting of the stand to new tree growth. Cutting governs the seed supply as to kind and amount and has a very great effect upon the type of forest which will follow the cut.

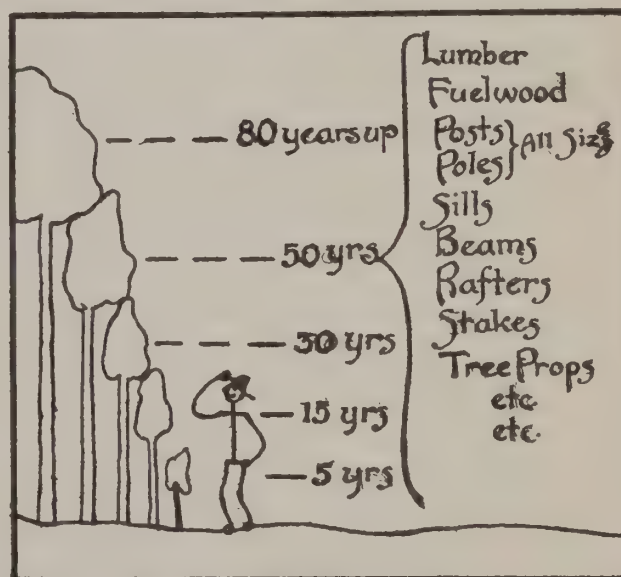
Generally, it is best to manage the farm forest as an uneven aged stand. This means that it should have a good balance of trees of all ages and sizes from seedlings to mature trees. Such a forest is ideal for the farmer who uses his timber in his farm operations. He will then have at all times trees of any size which may be needed.



The Harvest Cutting Should  
Provide for Re-seeding

Some trees (for example loblolly pine) do not grow well in uneven aged stands and for such species you should try to get a forest consisting of a number of small groups each of which would be even aged. They would be arranged so that the forest as a whole would include all ages and sizes. The uneven aged stand is also well suited to the market needs of the farmer. He can get a regular income from his woodland and can, through his regular cutting, do the improvement work needed to benefit future growth.

In the partial cutting method the larger and older trees are removed each time the area is logged. The object is to cut those trees that have reached the most profitable size or condition and also to take out the poorer trees whose removal will benefit those left standing.



The Uneven Aged Forest  
is Best for the Farmer

You will generally find it to your advantage to cut from only a part of the woodland each time you do logging rather than to cut over the whole woods. By so doing, logging costs are reduced and the damage and disturbance which go with logging are much less.

## The Growth Rate

It is very helpful before you begin any cutting to learn the approximate rate of growth so that the cutting may be kept within it. This is explained later under another subject, "Measuring Standing Timber".

### Partial Cutting in Even Aged Forests

If your woodland is made up of old or nearly mature trees, none of which can be kept for more than a short time (15-25 years) because of age and defect, it may be impossible to get a good uneven aged forest. Your cutting should, therefore, aim at producing another even aged forest. The cutting should remove in 2 or 3 operations (over a 5 to 15 year period) the entire crop of trees. In this type of cutting the larger trees or those in best condition are kept until the second or third cut, since they are needed to produce the necessary seed. After young trees are growing and the old trees are no longer needed they are cut. Damage from wind is always a great danger with this method and the owner should be prepared to go back and make a salvage cutting any time after the first cut is made.

### Selection of Trees to be Cut in Mature Stands

The same three questions which were listed in "Choosing Trees for Cutting in Young Stands" should be used in the selection of mature trees.  
Page 13.

### AAA Program

Remember that the AAA program carries benefit payments for woodland improvement work. See your AAA Committeeman or your Farm Security Supervisor for detailed information.

## PART IV

### MEASURING FOREST PRODUCTS

Anyone who sells or buys logs, pulpwood and other forest products should, for his own protection, be able to measure them. The farmer who, through lack of such information, makes a bad bargain in selling many years growth from his woods may stand to lose several hundred dollars.

Forest products are measured in many ways, the most common units being the board foot, the cord and the piece. The cubic foot, linear foot and weight measure are also sometimes used. In many states measurements are defined by law or regulation, particularly for the cord. The Department of Weights and Measures can supply exact information.



Both the Buyer and the Seller  
Need to Know How to Measure  
Forest Products

Board Measure - The board foot is the most common unit of measure applied to larger timber whether in the tree, in logs or manufactured into timber. It is equal to a board 1 foot square and 1 inch thick or said another way, it is 144 cubic inches of useable wood. In practice as we know, the sizes of finished lumber are often less than the dimensions given but this is well understood by all and never gives any trouble. For example, a scantling 2 inches by 4 inches by 12 feet will be 12 feet or a little more in length but would be only 1 7/8 inches by 3 13/16 inches or thereabouts in width and thickness.

The board foot content of a piece of lumber is gotten by multiplying: Length in feet times width in feet times thickness in inches. Thus the scantling mentioned above would contain  $12 \times 1/3 \times 2$  or 8 board feet.

Log rules have been made to show the amount of lumber in sound, straight logs of different diameters and lengths. Unfortunately there are a great many log rules in common use. Some of them are not at all accurate and generally show less scale than can be sawn, thus favoring the buyer. You should, therefore, notice the log rule being used when talking prices with a buyer as a very attractive price per thousand means little if the thousand is measured by one of the more unreasonable log rules.

The Doyle Rule is used more than any other in the Northeast. It is unfair to the seller especially if his logs are small. Good sawing will show an over run on every log under 28 inches in diameter.

The Scribner Rule is fairer than the Doyle and is becoming more popular. Careful sawing will give 10% to 20% more lumber from average second growth timber than is scaled by this rule.

The International Rule gives the closest scale provided good careful sawing is done. It is accurate for all sizes of logs. Some do not like this rule for scaling hardwoods but if the deductions for defect and crook



### The Scaling of Logs is Simple

and deducted from the gross scale of the log. Defects include fire scars, rot, check, shake, and crook or sweep. If the defect or any part of it can be taken off in the slab that part is not counted as defect.

You can get complete log rules giving the scale for logs of all common lengths by writing your State Forester or Extension Forester.

The table below gives you some of more important log rules. Comparison of the scales will prove very interesting.

### COMMON LOG RULES

(The values given are for 16-foot logs only)

Diameter of log inside bark at small end (inches)	Contents of log in bd. ft. by rule stated			Diameter of log inside bark at small end (inches)	Contents of log in bd. ft. by rule stated		
	Inter-national	Scribner Decimal C	Doyle		Inter-national	Scribner Decimal C	Doyle
4.....	5	(10)		16.....	180	160	144
5.....	10	(10)	1	17.....	205	180	169
6.....	20	20	4	18.....	230	210	196
7.....	30	30	9	19.....	260	240	225
8.....	40	30	16	20.....	290	280	256
9.....	50	40	25	21.....	320	300	289
10.....	65	60	36	22.....	355	330	324
11.....	80	70	49	23.....	390	380	361
12.....	95	80	64	24.....	425	400	400
13.....	115	100	81	25.....	460	460	441
14.....	135	110	100	26.....	500	500	484
15.....	160	140	121	27.....	540	550	529

NOTE: Volumes of logs longer or shorter than 16' are closely in proportion. That is, an 8 foot log 18" in diameter at small end will scale about 115 bd. ft. International.

are made as required, it is still the best. It is a sound fair rule and farmers with timber or logs to sell will benefit greatly when it is more generally used.

The scaling of logs is very simple. Many log rules are printed on the scale stick and the board feet can be read directly from it. Measurements for all the common rules are made of (1) the average diameter in inches at the small end of the log inside the bark and (2) its length in feet.

If any part of the log will not make sound useable lumber that part is called "defect" and must be estimated

## The Cord

The cord is used to measure pulpwood, fuel, chemical wood, and other short wood. The standard cord is a straight sided stack or rick of wood 4 feet high, 4 feet wide and 8 feet long. It thus contains 128 cubic feet of wood within these limits. As there are spaces between the pieces the actual solid wood will be about 90 cubic feet, depending on size of pieces and skill used in piling.

This is the "standard cord". In recent years the "long cord" or "unit" cord is coming into use in some sections. The long or unit cord is 8 feet long and 4 feet high but the width as determined by the length of the pieces may vary from 4 feet 6 inches to 5 feet 3 inches. If the pieces are 5 feet long the cord will contain 160 cubic feet or  $1\frac{1}{4}$  standard cords.

Some buyers ask for wood in long lengths to compensate for bark and spaces between the sticks. This is a weak reason and may be offered to hide a low price per standard cord. The buyer, of course, has the right to ask for delivery in whatever length best suits the trade but if the unit or long cord is used as a measure the price should be increased accordingly.

Fuelwood is often sold in stovewood lengths of 12, 16, or 24 inches as "short" or "stove" cords which are thus  $\frac{1}{4}$  to  $\frac{1}{2}$  of the standard cord.

The fair and accurate way to measure pulpwood or cordwood is to measure (1) the length of the rick or pile, (2) its average height and (3) the length of the pieces. To get average height when the pile is uneven measure every 8' or where noticeable differences in height occur, then total heights and divide by number taken. These three figures multiplied together gives the number of cubic feet in the pile and this divided by 128 gives the number of standard cords. For example: A rick of 5 foot wood is 30 feet long and averages  $6\frac{1}{2}$  feet high.  $30' \times 5' \times 6\frac{1}{2}' = 975$  cubic feet. This equals 7.6 standard cords or, on a unit cord basis, (160 cu. ft. to a cord) 6.1 unit cords. The price paid for the rick should be very nearly the same by either method.

## Piece

Many forest products are made directly from the timber for certain special purposes and have standard sizes and grades. Fence posts, railroad ties, telephone poles and mine timbers are examples. After price and specifications are agreed upon between buyer and seller, it is only necessary to count the pieces to get the value.

## Linear Foot

This unit is used generally for piling and long poles and then always with specifications as to size and quality. The method of measurement is, of course, self evident. 60 pieces of piling each 50 feet in length equals 3,000 linear feet.

## Cubic Foot

The cubic foot is not widely used. It should come into more favor for measuring woods of high value and for wood products which are com-

pletely used in manufacture such as pulp, charcoal or distillation.

### Weight

Weight measure is used occasionally for such special products as furnace poles, fuel, and rough mine props.

## PART V

### MEASURING STANDING TIMBER

The farmer often needs to know the amount and kind of timber on his land in order to decide how best to manage it. Certainly one absolutely needs this information before selling timber or buying land with timber on it.

The measurement of timber before it is cut is known as "cruising" "estimating" or "appraisal". It is not a hard job but seems so to the beginner because he must measure the tree which is round in terms of the cube (cord or square foot); also only the base of the tree can be reached handily for measurement. If you can get instructions and practice under a forester or experienced cruiser it will be helpful. Your FSA Supervisor or County Agricultural Agent can help you get such assistance.

Many farmers with timber to sell have felt that the job of estimating their timber was too difficult for them to do and have taken the eye-estimates of buyers or other persons very often with heavy loss to themselves when the timber was sold. It may not be necessary to measure standing timber if the products are to be measured later (by log scale or tally of sawn lumber) but this is not always possible.

If your woodland is less than 100 acres probably the most satisfactory way is to count the trees which are to be cut or are large enough to be saleable and to measure the volume of every tenth tree. The volume of each tenth tree may be read directly from a "cruiser stick" and the results multiplied by ten. Another way is to measure the diameter at a point  $4\frac{1}{2}$  feet from the ground by using a tape or calipers made for this purpose. This diameter plus an estimate of the height are put down as explained below for use with volume tables.



Keeping the Woodland Pro-  
ductive Takes Thought

The tools needed for measuring timber are not hard for you to get or to make. It is better in every way for the man who wants to measure his own timber to get from the Federal Land Bank at Springfield, Massachusetts, a set of their CRUISER and SCALE STICKS. The cruiser stick is used to measure standing trees and the scale stick to measure logs. The sticks come in a canvas carrying bag with complete instructions and cost but \$1.00 a set. Every farmer who has timber ought to have a set as they are quite reliable and very simple to use.

However, if you do not wish to purchase the tools others quite as good can be made by any person of moderate skill. See U. S. Department of Agriculture Bulletin #1210 "Measuring and Marketing Farm Timber". This can be gotten from the County Agent or from the Superintendent of Documents at Washington for 5 cents.



Tally by fives (~~||||~~) can be used or if you wish to save space the "Dot and Square System" is convenient.

1    2    3    4    5    6    7    8    9    10  
 •    ••    •••    ••••    •••••    ||    |||    □    □    □    □

It is always best to use volume tables which have been made for your locality but for most board feet estimates where great accuracy is not needed "combination" tables can be used. Two such tables are given below, one for hardwoods and one for softwoods with corrections which are to be used with them.

Amount of Saw Timber in Hardwood Trees of Different Diameters  
and Merchantable Heights\*

Diam- eter of tree breast- height (in.)	Number of 16-foot logs									Diam- eter of top inside bark
	1	1½	2	2½	3	3½	4	4½	5	
	Volume-board feet									
										in.
8....	20	27	35	43						6
9....	20	32	42	53						3
10...	20	36	52	64	81					6
11...	21	43	62	78	98	120				6
12...	23	50	73	93	120	140	180			6
13...	25	58	86	110	140	170	200			7
14...	27	67	100	130	160	190	230	260		7
15...	30	77	120	150	180	220	260	300		8
16...	34	89	130	170	200	250	290	340	390	8
17...	38	100	150	190	230	280	320	380	440	9
18...	43	120	170	210	260	310	360	420	490	10
19...	48	130	200	240	290	350	400	470	540	10
20...	54	150	220	270	330	390	450	520	590	10
21...	62	170	250	300	370	440	500	580	650	11
22...	69	190	270	340	410	480	550	640	720	11
23...	77	210	300	380	450	530	610	700	790	12
24...	85	230	340	420	500	580	670	770	860	12
25...	93	250	370	460	550	640	740	840	940	13
26...	100	280	410	510	600	700	810	910	1020	13
27...	110	300	450	560	660	770	880	990	1110	14
28...	120	330	490	610	720	830	960	1080	1200	14
29...	130	360	530	660	780	900	1030	1160	1300	15
30...	140	390	580	720	850	980	1120	1250	1400	15
31...		420	630	770	910	1050	1200	1350	1510	16
32...		450	690	830	980	1130	1290	1450	1620	16
33...		480	740	890	1050	1210	1380	1560	1730	17

Amount of Saw Timber in Hardwood Trees of Different Diameters  
and Merchantable Heights (con'd)

Diam- eter of tree breast- height (in.)	Number of 16-foot logs									Diam- eter of top (inside bark)  In.
	1	1½	2	2½	3	3½	4	4½	5	
	Volume-board feet									
34....			800	950	1120	1290	1480	1670	1860	17
35....			860	1010	1180	1380	1570	1790	1990	18
36....			920	1070	1250	1460	1680	1910	2140	18
37....				1130	1320	1550	1780	2040	2290	19
38....				1190	1390	1640	1890	2170	2450	19
39....				1250	1460	1730	2000	2300	2600	20
40....				1310	1540	1820	2120	2430	2760	20
41....					1610	1910	2240	2570	2930	21
42....					1680	2000	2360	2720	3100	21
43....					1750	2090	2470	2860	3270	22
44....					1830	2180	2590	3010	3450	22

\*Gives volumes of trees about as sawed out in average practice.

Correction factors for different species

Chestnut - For diameters from 8 to 40 inches, subtract 10 per cent.

Chestnut Oak - For diameters from 32 to 40 inches, add 10 per cent.

White Oak - For diameters from 18 to 40 inches, add 10 per cent.

Other Common Hardwoods - For all diameters, use the table without change.

Amount of Saw Timber in Softwood Trees (Pines, Spruces, etc.) Of  
Different Diameters and Merchantable Heights\*

Diameter of tree breast-height (inches.)	Number of 16-foot logs						
	2	2½	3	3½	4	4½	5
	Volume (board feet)						
8.....	37	52	66	75	84		
9.....	41	58	70	82	93		
10.....	47	66	77	92	100	120	
11.....	53	74	86	100	120	140	
12.....	60	83	97	120	140	160	200
13.....	68	94	110	130	160	190	220
14.....	77	110	120	150	180	210	240
15.....		120	140	170	200	240	270
16.....		130	160	190	230	270	310
17.....		150	180	220	260	300	340
18.....		170	210	250	280	330	380
19.....		190	230	280	320	370	420

Amount of Saw Timber in Softwood Trees (Pines, Spruces, etc.)  
Of Different Diameters & Merchantable Heights\*

Diameter of tree breast-height (inches.)	Number of 16-foot logs						
	2	2½	3	3½	4	4½	5
Volume (board feet)							
20.....	210	260	310	360	410	470	
21.....		290	350	400	460	520	
22.....		320	390	440	510	570	
23.....		360	430	490	560	620	
24.....		400	470	540	620	680	
25.....		440	520	600	680	740	
26.....		480	560	660	740	810	
27.....			600	720	800	880	
28.....			650	780	870	950	
29.....				840	940	1030	
30.....				910	1010	1100	
31.....					1080	1180	
32.....					1150	1260	
33.....					1230	1340	
34.....						1420	
35.....						1500	
36.....						1580	

\*Gives volumes of trees about as sawed out in average practice. Diameter (inside bark) at top, 6 inches.

Correction Factors for Different Species

Hemlock:

For diameters from 8 to 10 inches, add 10 per cent.

For diameters from 11 to 20 inches, add 22 per cent.

For diameters from 21 inches and up, add 20 per cent.

Red Spruce:

For diameters from 8 to 10 inches, add 5 per cent.

For diameters from 11 and up, add 25 per cent.

Shortleaf Pine:

For diameters from 10 inches, and under add 15 per cent.

For diameters from 11 to 19 inches, add 25 per cent.

For diameters from 20 to 23 inches, add 35 per cent.

For diameters from 24 inches and over, add 40 per cent.

White pine and other common conifers, all diameters, use the table without change.

An Example of Figuring Volumes With the Table

Suppose you have made a cruise. All trees were counted and every tenth tree measured. You find that on the white pine sheet, for example, there are 12 trees which are 14 inches in diameter 4 1/2 feet above the ground and have 3 useable 16 foot logs in each tree. By looking in the table, you see that one such tree has a volume of 120 board feet. As you have tallied 12 trees the total volume in the trees measured is 1440 board

feet and since you have measured every 10th tree, there will be in the woodland a total of 120 trees of this size having a volume of 14,400 board feet. The same sort of calculation is made for the other tallies and the totals are run up.

Much the same system would be used in figuring cordwood from a table giving such volumes.

If the timber contains rot or other defect or the trees are unusually crooked, then some deduction for the amount lost must be made. To do this accurately calls for much experience but you can estimate while measuring the tree how much of it will be lost in the sawing and make a deduction in the proper amount. If the defect is found uniformly over the woods, it may be as well to estimate a flat deduction to be made from the total volume.

### Measuring Growth of Forests

An estimate of the volume of standing timber gotten as explained before, is good for only a relatively short period of time. The forest is constantly growing and increasing in volume unless it is disturbed or cut. It is of great importance to know the rate of growth because with this the amount of timber which can be cut each year or in a period of years may be figured. Here is the way to do it.

A count is made of the number of annual growth rings in the last inch of radius. You can get this from the stumps of recently cut trees or by cutting shallow notches into trees that are to be cut soon. The notch should be made at breast height (4 1/2 feet from the ground) or if a stump count is made a slight allowance may need to be made for somewhat more rapid growth lower down on the tree. Counts must be taken on a number of trees well scattered over the woodland and should include the different sizes, the slow growing and the rapid growing. For each tree on which a ring count is taken the diameter d.b.h. (4 1/2 feet from the ground) must also be measured.

The table below gives the per cent of growth for various sized trees according to the number of rings in the last inch of radius.

d.b.h. (inches)	Rings Per Inch					
	4	6	8	10	12	14
	Approximate Per cent Volume Growth*					
4	25	17	12	10	8	7
6	16	17	8	7	6	5
8	12	8	6	5	4	4
10	10	6	5	4	3	3
12	8	5	4	3	3	2
14	7	4	3	3	2	2
16	6	4	3	2	2	2

d.b.h. (inches)	Rings per Inch					
	4	6	8	10	12	14
	Approximate Per cent Volume Growth*					
18	5	4	3	2	2	2
20	5	3	2	2	2	1
22	5	3	2	2	2	1
24	4	3	2	2	1	1
26	4	3	2	2	1	1
28	4	2	2	1	1	1
30	3	2	2	1	1	1

\*For very tall and well formed trees the values would be somewhat higher; for poor short trees somewhat lower.

If you have a tree 14 inches d.b.h. (diameter at breast height or 4 1/2 feet above the ground) and your ring count shows 8 to the inch you look to the right from 14" and in the column under 8 read 3%. The tree is adding to itself approximately 3% compound interest every year.

Suppose you have measured a number of trees and find that the growth rates ran from 2 percent to 6 percent with an average of 3 1/2 percent. The cruise you have made shows that on this piece of woodland which is, say, 20 acres in size there are 4,000 board feet of timber per acre or a total of 80,000 board feet. 3 1/2% of 80,000 is 2,800 board feet which is all the volume for the present which can be cut from the woodland each year. Now if you need 1,500 board feet a year for your own use (fuel, lumber for repairs, etc.) you will have 1,300 which you can cut for sale. This is too little to be bothered with every year so you will probably cut every 10 years or so. If cut every 10 years you can cut 13,000 feet for sale and perhaps more if you have improved the forest in the meantime and raised the growth rate.

## PART VI

REFORESTATION OR TREE PLANTING

"Worn Out Fields or Pastures  
Can Grow Trees"

The well managed farm woodland should not need planting to get the next crop of trees. But some farm woodlands are badly run down and may be so badly damaged by fire and overcutting that little seed is produced and young growth cannot be secured quickly. Perhaps the farmer may wish to grow other kinds of trees than those which are now found or he may wish to grow a larger proportion of one species than another.

Sometimes there is no woodland whatever and some is needed. There may be worn out, eroded fields or pastures which can be put to growing trees.

In such cases the farmer must plant or sow to get the kind of woods he wants. The planting of small trees (seedlings or transplants) is the usual, the cheapest and the best method. The sowing of seed direct is seldom successful. The nut trees, such as walnut, hickory and oak, may, however, be started by direct seeding in locations where field mice and squirrels will not destroy the seed.

For some tree species which sprout readily (willow, poplar and cottonwood) cuttings are used.

A great deal has been written about the art of tree planting. It is good for any farmer thinking about setting out trees to get from his FSA Supervisor or County Agent complete information about kinds of trees to plant and how to go about getting stock and doing the job. Further, the State Foresters in all the Northeastern states are able to furnish planting stock of proper kinds to farmers at cost under the well-known Clarke-McNary Program. The cost runs from \$1.50 to \$12.00 per thousand trees the average being about \$2.00 for seedlings and \$4.00 to \$5.00 for transplants. Orders must usually be placed well ahead of time. Most planting ought to be done in the spring as soon as the frost is out of the ground. One ought to have his plans made and his order in by the first of the year.

Commercial nurseries also furnish stock for forest planting and often have the rarer kinds of trees which the state nurseries cannot furnish. The prices of such stock are nearly always higher than the prices quoted by state nurseries as it is produced largely for those who cannot get the state-grown stock under the Clarke-McNary Program.

Experience of many farmers has clearly shown that tree plantations are very much worth while especially on farms which have no natural woodland and on farms where the buildings are severely exposed to the wind and where livestock may lack shelter. Many such plantations or windbreaks have been made on good soils which might have produced a higher cash income if planted to other crops yet the owners feel that the protection to livestock and

buildings, the saving in fuel costs and the better appearance of the farm has made them well worth while.

When protection is not important you may consider planting on those parts of the farm which are not producing well in crops or pastures. Steep slopes, eroded or sandy soil, land going back from pasture to brush due to lost fertility are all capable of growing timber. Low wet lands which are not tillable will often produce good stands of poplar, red gum, swamp white oak and other moisture-loving species.

Since all states in the Northeast have well organized planting programs it is thought better to recommend the reader who wants to do planting to his State Forester and Extension Forester who will, on request, send him the state bulletins giving local information on planting and will tell him how to get planting stock.

#### AAA Program

The AAA Program carries benefit payments for planting forest trees. See your AAA Committeeman, or your Farm Security Supervisor for information.

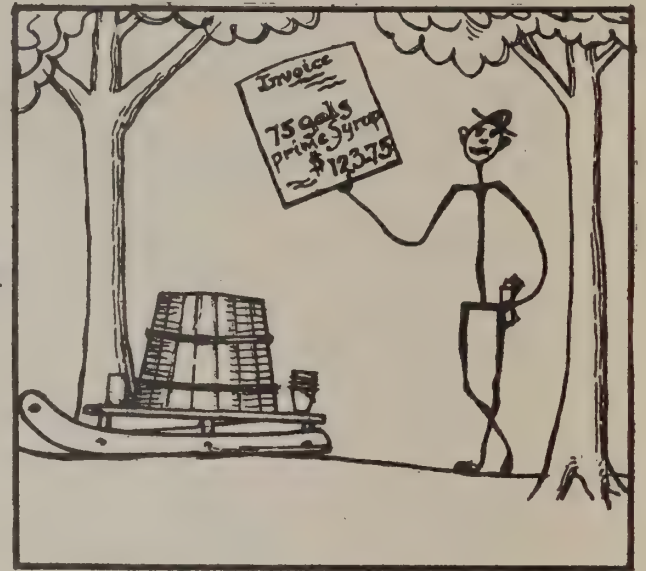
## PART VII

### SPECIAL PRODUCTS FROM THE FARM WOODLAND

Your farm woodland can often yield products other than timber. In the Northeast the most important of these products are maple sugar and syrup and Christmas trees. Sugar groves or "bushes" and Christmas tree lots must be treated somewhat differently than woodlands where timber alone is being raised.

#### Maple Sugar and Syrup

Many farmers get an important part of their income from the sale of maple products. It is a long and exacting job to build up a good sugar grove but once it is brought into production it will, with care, continue to yield for 40 to 60 years. The woodland should have a high percentage of good sound hard or sugar maple trees (not less than 60 to the acre). Maples should not be tapped until they have reached a diameter of 12 inches at breast height. The best type of maple tree for sugar production has a large wide-spreading crown and a good deep root system. Such trees can be developed by care and treatment, principally proper cutting to encourage the good trees and give them growing space. The sugar grove must be protected from fire and livestock.



The Sugar Grove Can Be An Important Source of Income

Trees other than maple can, of course, be grown in the sugar grove. If you must get fuel and lumber for home use or sale from a single woodland other kinds of trees such as oak, tulip, poplar, hickory, ash or hemlock may be easily grown with the 60 to 100 maples which are reserved for tapping, but should be so spaced as to give the sugar trees all the room they need.

Maple trees continue to produce good quantities of sap at quite an old age, often long after the growth rate has become very low. As long as the trees are sound and continue to yield good quantities of sap they should be kept in production but as soon as symptoms of disease, rot, serious frost checking and other signs of old age appear, the tree should be harvested for lumber while it still contains good material. Some trees, especially those grown as windbreaks or along fence rows, are too short stemmed and limby to make any lumber at all. Such trees are often good sugar producers and may be kept in production long after a better formed tree would be cut for its lumber.

You can make a sugar grove by planting small maples taken from the woods or bought from nurseries but the long period (50 to 60 years) before the grove begins to produce will discourage most farmers if they are interested only in sugar. Plantings are usually best made along fence rows and as groves near the farmstead where they can serve as windbreaks and add to the beauty of the farm. If you have a natural woodland which has a good number of healthy maples in it you will find it better to develop and im-

prove it for sugar production rather than to start from the beginning with a plantation.

The actual production of sugar and syrup is something of an art and those who plan to practice it ought to study it in detail, talk with others who have made sugar successfully and carefully figure costs and markets. Much equipment is required to make sugar and some of it, particularly the evaporator, is rather costly. An evaporator may cost between \$250.00 and \$1,000.00 and buckets and spiles (the spigots on which the buckets are hung to the trees) will be needed by the hundred.

All of the states of the Northeast in which maple sugar is produced have bulletins on maple sugar production which will be quite helpful even to those who have much experience in this field. These bulletins can be gotten for you by the Farm Security Supervisor or the County Agent. A very good bulletin is also available from the U. S. Dept. of Agriculture. It is Bulletin #1366 "Production of Maple Syrup and Sugar", and may be gotten from the Superintendent of Documents at Washington, D. C. for 10 cents.

### Christmas Trees

Many millions of Christmas trees are used every year and most of them are cut from natural forests, very often in a very destructive manner. There is nothing at all wrong or wasteful in using young trees for decoration except when the cutting of them ruins the land for further growth. With good management it is easily possible to get many cuttings of young Christmas trees from a piece of woodland and still have a good forest for lumber and other products.

**CAUTION!** Do not invest heavily in the growing or production of Christmas trees without first studying the market and future with great care. Get expert advice if you can. While some operators have been very successful the game is risky and the market can change greatly in a very few years. A Christmas tree lot may offer an interesting and worthwhile sideline but should not be depended on too much for regular income.



High Quality Saleable Christmas Trees Can Be Grown By the Farmer

The farmer may have some very real advantages in marketing his home grown trees. Trees shipped in often come from a distance after having been cut for several weeks and often arrive pressed out or shape and dry. The farmer can grow compact well formed trees much more attractive and saleable than imported stuff. He can cut them a day or two before marketing thus insuring that the needles will stay on better. Some farmers have sold Christmas trees successfully on the stump with the customer selecting the tree he wants before it is cut.

The balsam fir makes the best Christmas tree in the Northeast and the

spruces will rate second best. Pine, cedar and juniper are acceptable in some places but are not as good as the others. Christmas trees are usually best grown as artificial plantations although there will be some natural stands of well formed trees which will do just as well or better.

It is best to plant only vigorous transplant stock. This may be gotten from nurseries or seedling stock may be bought and transplanted for 2 or 3 years before setting out in the field.

In setting the trees they may be spaced much closer than would be the case in growing for timber. 4 feet x 4 feet spacing is generally used. Planting should be carefully done and the area is often prepared by plowing. Some cultivation and weeding may be needed for a year or so but if it encourages too rapid growth should not be used. The trees should not grow over a foot a year for best form and appearance.

If the plantation is to be permanent, new trees can be planted near the stumps of those cut or a new area can be planted each year.

#### Other Products

These can just be briefly mentioned as opportunities for additional income or for home use:

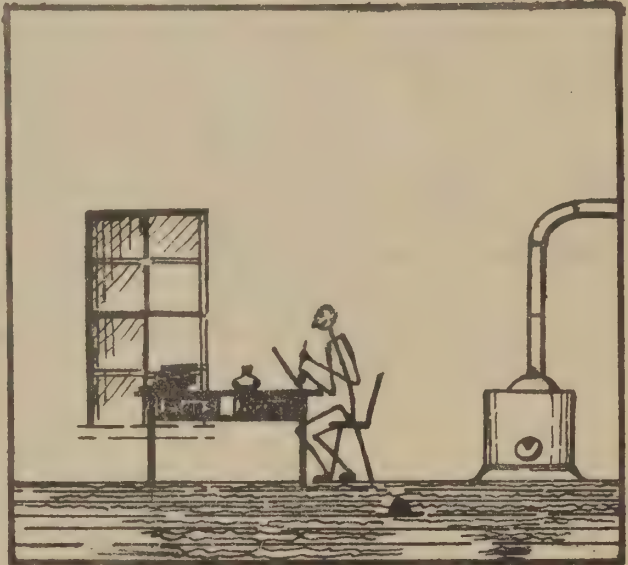
1. Nuts - Black walnuts, hickory nuts and buttermuts.
2. Tanbark from oak and hemlock.
3. Various nuts and seeds for sale to nurseries for plant production.
4. Holly and evergreen wreaths.
5. Various berries, drug and medicinal plants obtained from the woodland.

## PART VIII

### PLANS AND RECORDS

Planning the farm operations and keeping records on expenses and incomes makes for successful farming. The Farm Security Administration believes that the building of farm and home plans and the keeping of record books have done much to insure the success of its borrowers.

Many farmers have no written plans. They know their farms well and plan the operations from year to year in their minds from their experience and knowledge. They may not even keep records of income and expense. Many such farmers are also successful but this does not mean that planning and record keeping are not needed. Mistakes due to faulty memory, miscalculations and errors in judgment are less likely to occur if plans are made and yearly records of operations kept.



The Successful Farmer Plans His Operations and Keeps Good Records

It is very necessary to make plans and records for your farm forest because this crop is long in coming to maturity. Without them it may often be hard to tell if progress is being made. Plans and records for tenant operated farms are very necessary if both the owner and the tenant expect to get the most good from the woodland.

The farm woodland management plan is a part of the larger plan for the whole farm. The purpose of this farm plan is to get proper land use and a satisfactory income. The woodland management plan helps toward this end. It will give information on the following:

1. The quantity of timber and other products (including young growth) found in the woodland and the quantities that may be harvested.
2. The areas from which the products may be harvested.
3. The approximate time (year) when products may be harvested from each area.
4. How to improve the crop and obtaining a new crop.

Ask your Farm Security Supervisor how to make entries for your woodland in your farm plan and record book. These plans and records will help you more than anything else in deciding on how to manage your woods for greater profit.

Here is a form which you can make up yourself to keep day-by-day records and yearly summaries of the income from your woodland. This form is designed for use in keeping a day-by-day record of human labor, work-stock labor, as well as tractor and truck use.

Unit Number (not needed for small woodlands)	Date	Kind of Work	Labor			Work stock (hours)	Tractor (hours)	Truck (miles)
			Opera- tor Man- Hours	Family Man- Hours	Hired Man- Hours			

## ANNUAL SUMMARY OF LUMBER USED AND SOLD

[illegible]

TOTAL

1 - INCLUDES ALL SAWN FROM HOME-GROWN TIMBER WHETHER SAWN ON FARM OR AT CUSTOM MILLS.

2 - VALUES HERE ARE SAME AS COSTS OF THESE MATERIALS IF BOUGHT.

PART IXPROTECTING THE FARM WOODLAND

Trees are damaged by disease and insects the same as other plants and are injured or killed by fire, a type of damage which does not often affect the farmers other crops. Other important hazards to the forest are grazing by livestock and occasional damage by sleet and windstorm.

The protection of farm woodland is made somewhat easy because of its small size. It can be watched more closely than larger forests and it is not likely that damage could become serious before it was seen.

Fire

In the Northeastern states nearly all forest fires are man caused and

most of them are started through carelessness. Continued education and vigorous, impartial enforcement of the state fire laws will do much to reduce the heavy annual loss from fires caused by carelessness.



Most Woods Fires Are Man  
Caused

Fires tend to occur only at certain times of the year when fuel and moisture conditions are just right. The hardwood (or broadleaf) forests burn easiest in the early spring before the new green growth comes on while the softwoods, (pines, spruces, etc.) burn best during the dry midsummer or early fall months.

Fire Protection for the Farm Forest

It is not hard to protect the average farm woodland from fire as it is usually easy to get to any part of the woods on short notice and fires can be quickly found and easily put out while they are small.



Fires Are Easily Put Out If  
Caught While Still Small

It is not hard to protect the average farm woodland from fire as it is usually easy to get to any part of the woods on short notice and fires can be quickly found and easily put out while they are small.

Since nearly all fires in farm woodland are man caused they may be prevented if enough effort is given to it. The following general rules for fire prevention are recommended:

1. No smoking in or near the woods during dry weather.
2. Burning brush, slashing and rubbish. Dispose of slash by lopping and scattering without burning if possible. When burning is necessary comply with the state law. Never within 100 feet of woodland when the woods are dry and never during dry windy weather. Keep piles small, burn during damp or rainy weather and have always sufficient men, tools, water on hand to

handle any emergency.

3. Lop and scatter or burn slash from logging to hasten decay and reduce fire hazard.

4. Cooperate with neighbors and with the state or town Fire Warden. Know who to call and how to call him. Join up with the Warden's fire crew or serve as guard if you are needed; at least willingly go out to fight all nearby fires if needed. Your woods may be next!

5. Plowed or cleared fire breaks to mineral soil 8 feet in width to be constructed to protect high value timberland subject to burning from highway or road. These will need annual care.

6. Posters or signs as needed to warn travelers, hunters, fishermen, etc. against carelessness with fire.

7. Prosecute to the full extent of the law if parties responsible for setting fires fail to make good.

You should not only be prepared to fight a fire in your own woodland should one occur but should know how to do it. Cooperation with the state or local Fire Warden will be helpful in this. For tools many of the usual farm implements can serve: garden rakes, hoes, shovels, axes, grub hoes and mattocks. The tools which would be bought especially for fighting woods fires would be the heavy fire rake and the knapsack fire pump. This fire pump is a very fine tool. It will pay for its cost on one fire. They cost from \$12.00 up and may be bought through the fire warden, the fire department or through hardware stores. They are also very good for fighting fire in farm buildings.



Cooperate With The Fire Warden

### Fighting Fires

If the fire is not burning too strongly you can usually attack it at its head and extinguish it by raking, beating or shoveling a fire line to the mineral soil at the edge of the flames or a short distance (2 feet - 5 feet) ahead of them. The back pack pump is used to cool down strongly burning sections and to mop up after the fire is under control. The work is carried from the head around both sides and around the rear until the fire is under control. On this job the more men the better but you should not delay in attacking the fire with whatever is at hand as soon as it is discovered. There must be no unburned strips between the fire line and the edge of the fire. If the fire does not burn up to the edge of the line, the line must be rebuilt closer or the material burned out. The fire should be watched closely for several days afterward to make sure that it will not break out again.

## Livestock

Protection of the woods against grazing is important. Farm woodland in the Northeast is more often grazed than not if we can use this word to describe what happens. Usually the poor cow or sheep gets more exercise



The Cow Usually Gets More Exercise Than Nourishment

than nourishment from its wanderings up and down the slopes and through the thickets. Whatever nourishment is gotten will come from the tender shoots and sprouts of the young growth at the expense of the future forest. Add to this the trampling and compacting of the soil, injury to the roots, and stripping the bark from the larger trees and the woodland soon begins to show the effects in lowered growth and dying timber.

This type of damage is often more serious than fire and is the worse because there is no relief from it; it continues year after year and the longer it continues the harder it is to bring the forest back.

Most grazing is done in the hardwood forest, but even in stands of pine or spruce it may do much harm by destroying the seedlings of valuable hardwoods coming up to form the next crop. Grazing damage may retard the next crop by 20 years or more, and should be avoided in cut over woods as well as in well stocked woodland.

The evidence is clear that you cannot grow both timber and forage on the same acre and get enough of either to make it worth your while.

There may be a few woodlands now being grazed which would give a better income if they were cleared except for trees wanted for shade, improved with fertilizer and seed and all things done to make a real pasture. Where this cannot be done the woodland should be put to growing wood. The first step is to get the stock out of the woods and give the timber a chance to show what it can do.

In most states the AAA Program offers benefit payments for protecting the woodland from grazing. See your Committeeman or your Farm Security Supervisor for information on this practice.

## Insects and Disease

The farmer who owns woodland should be on the lookout for insect damage and should take prompt action whenever he suspects an unusual amount of injury from this cause. Insect infested trees soon lose their normal appearance and will attract attention in a stand of healthy trees. You should look for borer holes in the bark or wood, sawdust castings or droppings, pitch or resin oozing from borer holes in the bark. If the leaves or needles are being eaten this is easy to see as is drying out and curling up of the leaves. The dying back of twigs and leaders may show the presence of an insect which can be found by opening up the stem.

Some damage from insects is going on all the time and control measures are practical only if the damage promises to become great. Always report any unusual insect activity or damage at once to your State Entomologist or the State Forester.

Spraying, dusting and fumigating are much too expensive to use on woodlands. The only practical measure usually is to cut and burn the trees or the infested parts and thus destroy the breeding places. Infested material can often be salvaged and used for many purposes. In addition you can do much to prevent insect attacks by keeping the timberland healthy and fast growing.



A Healthy Fast Growing Tree Can Resist Insects and Diseases

The signs of disease are in many ways like those of insect infestation. Drying of twigs and leaves, cankers or growths, cavities, pitch or sap flowing from the tree, and the presence of mushroom-like growths will all indicate disease. It is hard to identify the diseases with certainty and an expert is often required to do this and advise on control measures.

As with insects, you can control diseases of trees only indirectly. Selective cutting and improvement work to keep the forest healthy and growing rapidly, together with protection from injury by fire and grazing, all help to reduce loss from disease. The early cutting of infected material is also helpful and the wood cut can often be used satisfactorily for fuel.

## PART I

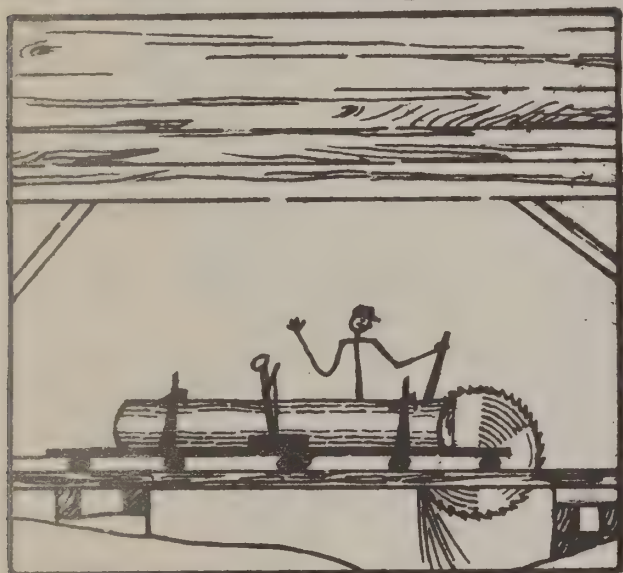
### FOREST PRODUCTS

Since a farm woodland may and usually does yield more than one product it is well for the farmer to know something of the various kinds of products which might be taken from the woods so that he may manage his woodland to produce the highest income possible.

You will find it better, if you can, to grow a variety of products in your woodland. You can then be more sure of supplying your own needs and will not be so apt to be caught at a loss should the market for one product or another fail.

#### Sawlogs

Nearly all kinds of trees which grow large enough (14-16 in. d.b.h.) are suitable for sawlogs and this form of product will usually give the



best return as a final crop. It is customary in many places to buy logs on specifications or grades. This is good practice as it gives a deserved premium to the farmer who has gone to the expense and trouble of growing clear, straight logs.

The State Forester or Extension Forester can give you any desired information as to loggrading practice within your state. The rules describe the qualities which logs must have to be acceptable in each of the 3 or 4 grades.

#### Sawlogs Are Usually the Best And Most Profitable Product To Grow

You can do much to increase the value of your logs by careful cutting to eliminate rotten sections, and

particularly by cutting the tree to reduce crook or sweep and very knotty sections. This calls for cutting usually at the point of greatest bend and laying out the length of the logs on either side from that point. Knots and rot should be kept within the same log as much as possible.

Care should be also taken to cut the logs squarely. Be sure to leave the amount of extra length required for trim (4 to 6 inches for a 16 foot log) and avoid over-notching or splitting of the butt log when felling. Some buyers will grade down logs if they are dirty or covered with gravel and sand which will dull the saw. The miller particularly dislikes logs taken from trees used as fence posts or for other purposes. They may contain nails or other metal which will ruin a saw. If you have logs with metal in them you will do better often to use the short butt logs for split fence posts or fuel than to try to sell them and have the buyer become prejudiced against your product.

#### Veneer Logs

There is a limited market for large, clear high quality logs of some

kinds of trees for cutting into veneer. Walnut, gum, oak, yellow poplar, maple and birch are some of the kinds used. The logs must be straight, clear and free from defect. The grades are very strict and you should carefully study them before making such logs. The prices offered are quite high often 2 or 3 times those obtained for sawlogs.

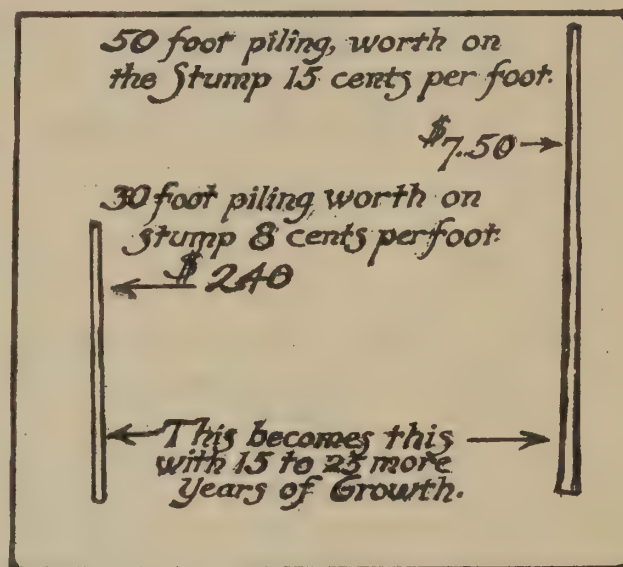
### Poles and Piling

These products are often the most valuable you can produce from your woodland. The grades must be carefully met if good prices are to be obtained. They should be of the right kind of tree, strong, straight, clear and with little taper. They must be free from rot and defect and should not have many or very large knots.

The prices paid per foot for short lengths are generally much lower than those paid for the longer lengths and it is often better to leave small trees stand for a few years to add the necessary growth rather than cut them as soon as they reach a size than can be sold.

### Pulpwood

Pulpwood does not usually bring as high a price as good quality sawtimber but a pulpwood market offers a chance to sell at a profit material which could not be sold otherwise to advantage. Trees cut in thinning or other improvement work and the tops and limbs from trees cut for sawlogs or ties are often quite suitable for pulpwood.



### Prices Are Much Better For The Longer Lengths

In this region the spruces, balsam, southern pines and most hardwoods are useable for pulp but you should look into the market beforehand as some mills can use only certain kinds of wood. In all cases the wood must be absolutely sound and clear. It must be free from any burned or charred wood as charcoal stains the pulp and cannot be bleached out. Most buyers will not accept sticks under 4 inches at the small end and many have their own rules for the lengths of the pieces as explained under "Measuring Forest Products". Some require that the sticks be peeled and that larger pieces be split. All these requirements you should know about before you start your work.

Where pulpwood is a low priced product it is often better not to cut the larger trees (10 inches or over d.b.h.) for pulp. Allow them to grow to larger sizes for piling, sawtimber, or other more valueable forms.

### Cooperage Stock

Tight cooperage must be able to hold liquids and woods suitable for this purpose must be of the very highest quality, clear, sound, free of all defect and waterproof. White oak is the tree usually desired. Prices paid for suitable material are very high. Short lengths are used and care-



Cutting Should Not Be Done Unless Most of the Tree Can Be Used

producing for this market.

### Cross Ties

Cross ties can be made by either hewing or sawing. The farmer is usually interested only in hewn ties as sawn ties are a mill product.

Hewn ties are produced from any part of the tree which is straight, clear, not less than 8 inches nor over 15 inches in diameter inside the bark. Many kinds of wood may be used. The wood, however, must be hard and strong and free from defect. The following kinds of trees are often used for cross ties without preservative treatment (they must be largely heartwood) and bring the best prices: white oak, walnut, black locust, catalpa, tamarack, cypress and cedar. For treated ties nearly all common hardwoods and the sapwoods of the above are used.

The market for ties should be looked into very carefully before cutting as prices fluctuate a good deal and specifications must be closely met. Some buyers will accept only certain kinds of wood, therefore, it is always well to have full information before beginning to cut.

The making of hewn ties offers a good chance to make profitable improvement cuttings in your woodland. Slow growing trees can be taken or crowded stands thinned. It is not good practice usually to cut straight clear, rapidly growing trees for ties as they will bring more profit if allowed to grow for a few years until they reach sawlog size.

### Mine Timbers

These are known usually as mine "props" and there is hardly any class of material in which the sizes vary so much. Lengths run from 2 to 20 feet or more; diameters (at small end) from 2 to 14 inches. Most props are used in the round but may occasionally be split or sawn.

The prices and demand for mine timbers are variable and you ought to be well informed on what and how much is wanted and prices to be paid before cutting.

ful cutting of the best trees will often give you a much higher return than cutting for sawlogs or ties. There is a great deal of waste if the woodland is cut for tight cooperage stock only and cutting should never be done unless you have a market or use for the rest of the stem.

Slack cooperage does not demand high quality material. Such containers are used for apples, potatoes, flour, cement and many other loose goods. Basswood, elm, oak, gum, the pines, in fact nearly all kinds of wood which have fair to good strength are used. The specifications vary greatly with the type of container being made and you should be well informed on them before

Strength is the most important quality in mine timber. Oak is the preferred wood, but nearly all hardwoods and the stronger softwoods are also used.

### Fence Posts

There is usually a fair market for fence posts in most parts of the Northeast. You will find it better and cheaper to at least make your own posts even if you are not able to make them for the market.

Durability is most important in posts which are to be used untreated. The following trees are found to be good for this purpose: black locust, osage orange, cedar, catalpa, cypress, tamarack, white oak. Woods which are not naturally durable are often used for fence posts after treatment with creosote, zinc chloride or other preservatives and are quite satisfactory. In fact, if durable woods are scarce and expensive it is often better and cheaper to use treated posts of some short-lived species such as aspen or elm.

The usual length for posts is 7 feet and posts larger than 8 inches at the small end are usually split. The bark should be peeled and the post ought to be well seasoned before it is put in the ground.

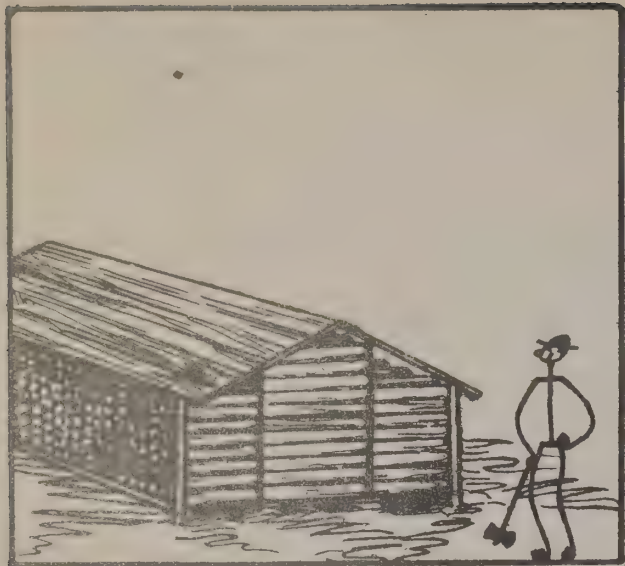
### Fuelwood

Every farm ought to produce the fuelwood needed for heating and cooking. Many farmers buy adjoining or nearby pieces of woods for this one purpose. Fuelwood is often a cheap product but if this or another kind of fuel has to be bought it makes quite an item of expense in the course of a year. If you have a woodland which produces logs or other saleable products you may often find in fuel a profitable outlet for the poor trees and inferior kinds of timber which you may want to get rid of in order to improve the woods. The stumpage value of fuelwood is seldom very great. If there is a chance to get a days wages out of the job and improve the forest at the same time the farmer need not care if the trees cut show any stumpage value at all.

Practically any kind of tree can be used for fuel but some are better than others. Oak, maple, beech, and hickory are especially good for fuel and a standard cord (4' x 4' x 8') of stacked dry wood of these kinds has as much heat in it as a ton of good soft coal.

Wood often does not give satisfaction as a fuel because it is not properly prepared. The most important thing to remember in using fuelwood is that it must be seasoned. Properly seasoned wood will give usually at least one half more heat than green wood. It is well worth the trouble to cut it and store for drying ahead of need. Green wood not only does not give all of its heat but is hard to start and burn. It produces smoke which rises slowly and deposits large amounts of soot and creosote in the chimneys and stove pipes. Many burned farm houses can be traced to chimney fires which started from this cause. The burning of green wood is also hard on stoves and will cause the fire boxes to burn out long before their time.

It takes some months to season wood and it is well to plan a year ahead on your fuel, that is, have a year's supply ahead all the time.



### A Year's Supply of Wood Laid By For Seasoning

2 to 2 1/2 inches or a certain amount of rot although rotten wood has little heat value. You should guard against cutting for fuel the good straight high valued trees which can grow into a better product. A cutting for fuelwood should be done so as to improve the forest by taking out the poorly formed or slow growing trees of inferior kinds.

### Distillate and Charcoal Wood

There are some markets for wood to be used in charcoal or distillation plants. Hardwoods are used chiefly and the wood taken is similar to fuelwood as to grade and kind.

### Handle and Other Small Dimension Stock

Large quantities of high grade hardwoods in small sizes are used for making handles, implements and machinery parts. Ash, hickory, and maple are the principal species used. Second growth logs with a large amount of clear, straight grained sapwood are preferred. The market specifications and demand should be studied before making this type of material.



Sapwood is Desirable for Handle  
And Implement Stock

If this can be stored under an open shed or shelter and piled on skids to let the air into the bottom of the stack so much the better. If piled in the open the top of the pile should be roughly "thatched" with small cut wood so that rain and snow will tend to drain off.

Fuelwood to be sold must in nearly every case be dry to give satisfaction to the customer. Other than this the only market requirements are for cutting to proper length which is according to local use or practice. Slabs and other saw mill waste make good fuelwood.

For use on the farm there is no objection to using small pieces down to

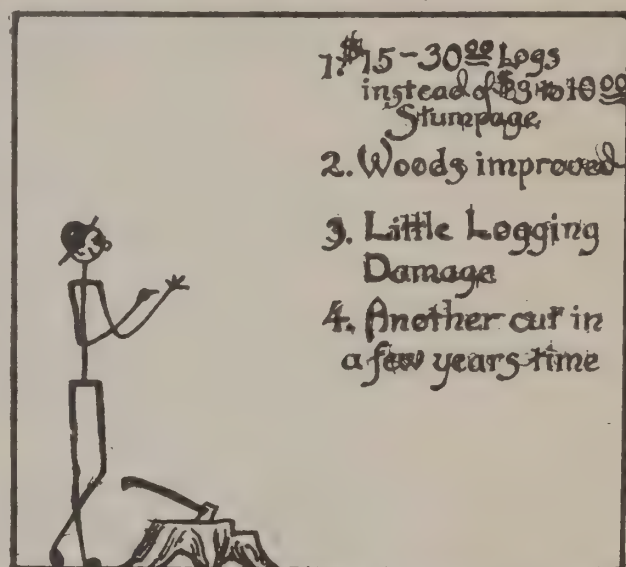
In addition to the woods mentioned you will find that the hophornbean and the blue beech (or muscle wood) will make very fine tool and implement handles for use on the farm; better than most that can be bought.

### Cutting and Hauling Forest Products

Many farmers do not get all the income they ought to have out of their woodlands because they sell just the stumpage rather than the logs or other partly finished products. It is much better to harvest the woodland yourself

or have it done by your own hired help. Then you can see that the timber is cut just the way you want it; you can use the care needed to protect the younger trees from injury, you can do in all ways a much better job to insure the future growth of the woods than you can get from most loggers who are interested only in the profit at hand.

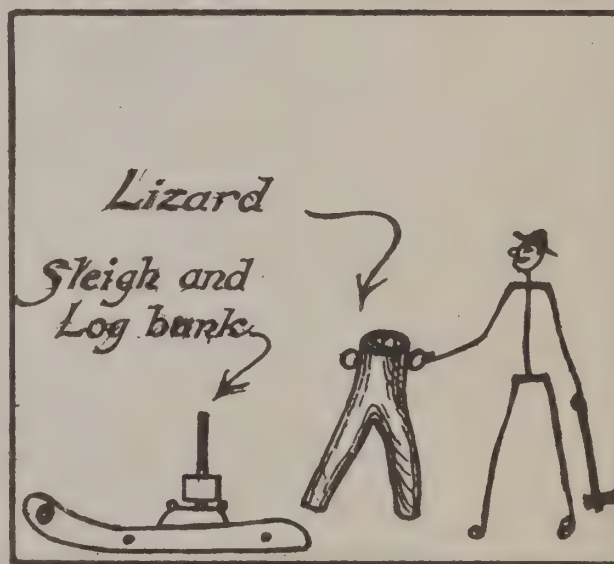
Logging or making cordwood is not a hard job and certainly takes no more skill than many other jobs on the farm where heavy, bulky goods have to be handled and transported. In many sections of the Northeast farmers do logging in their own or their neighbor's woods every year or work part time for wages in commercial operations. These men look at logging as a normal part of their work. Farmers who have not done logging often hesitate to go into it thinking that it will take up too much time. Actually the time you spend in your own woods may pay better than the time spent on field crops or livestock.



Work in the Farm Woodland Pays Good Wages

The equipment needed will depend on the type of operation and the size and weight of the pieces to be handled. Power can come from a tractor, horses and in some localities oxen. Heavy sleds, drays or wagons are needed for hauling out of the woods and can be built in whole or in part on your farm. If the material is to be hauled some distances a truck, either standard or semi-trailer is needed. Trucks can be changed very easily for hauling logs or pulpwood. Hand tools, such as axes, saws, wedges, tongs and peavies will be needed, also chains or cable for hauling, loading and binding loads. A clever man who is in the habit of "doing the best he can with what he has" can make or get together what he needs at small expense to do an efficient logging job.

Listed below are the steps in getting material out of the woods and to the market. For the inexperienced man a day or two spent looking over an actual, well set-up job, seeing the equipment used and how the various operations are carried out will make it clearer than any amount of reading.



Simple Logging Equipment Can Be Made on the Farm

#### A. Felling

1. Cut small trees (6-8" or smaller) with the axe. Larger trees are notched with axe and felled with saw. Tree falls in direction toward which notch points. Avoid felling into other trees or knocking down young timber.

2. Use wedges to prevent the cut from binding on saw.
3. When tree begins to fall pull saw clear and step out of way to avoid "kick" of butt.
4. Cut stumps low to avoid waste - 1 foot or  $\frac{3}{4}$ ths of the diameter of tree whichever is greater. That is, for a 28" tree the stump should not be over 21" high.

B. Limbing

1. Remove limbs with axe cutting close and neatly working from butt toward tip.

C. Bucking

1. Carefully lay out into log lengths or pieces allowing required trim on each.
2. If peeling is to be done this is the point at which to do it if the season is right. (Springtime when bark will slip.)
3. Cuts with saw to be fair and square.
4. Use wedges or liftpoles to prevent binding or splintering.

D. Swamping and Brushing

1. Clear out skid trails or haul roads of slash and brush so that power can be brought to the logs.
2. If branches and tops are to be used this is a good time to get them out and cut up.
3. Lopping and scattering brush to reduce fire hazard may be done now but if there is much of it, it will best be done later when the material has been removed.

E. Skidding (twitching)

1. Large pieces are dragged (chain and tongs or grab hook) by team, tractor or oxen along the ground to a place where they can be loaded on wagon or truck.
2. For large heavy pieces a small heavy sled or "go-devil" or "lizard" made from a large tree fork is bound under front end of piece being dragged. A "high wheel" is often used if the ground is not too rough.
3. Pulp or fuelwood is often skidded out in long lengths from where it is cut to a more open place where it can be peeled (if this is done) and bucked up. It may be hauled out in short lengths on small drays.
4. If the pieces are small, skid several at once.

5. Avoid injury to standing timber when skidding.
6. Keep haul roads close enough together so that no piece will be skidded over 500 feet.
7. If cordwood is sold on the road it should be made into neat compact ricks for easy measurement. Should be on skids to keep moisture from bottom of pile.

#### F. Hauling

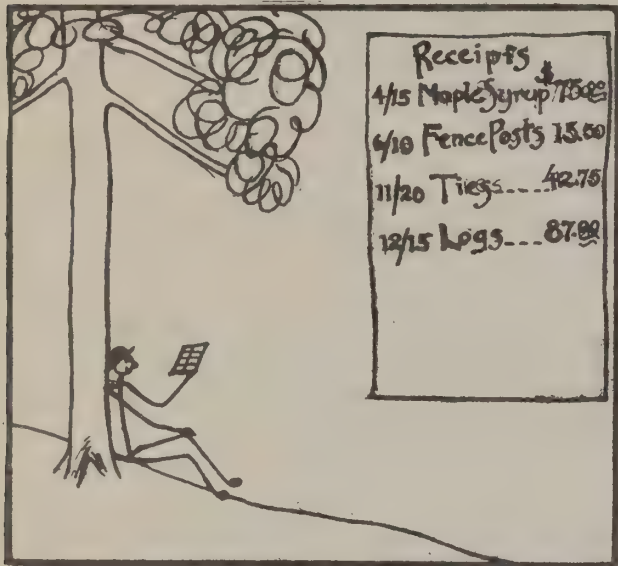
1. Small pieces of light timber and cordwood can be loaded by hand (one or two men).
2. Larger pieces may be loaded by rolling up on incline made of two poles set from the ground up to edge of truck, sled or wagon. If piece cannot be rolled by hand or peavy use a cross haul with tractor or team for power.
3. Load should be firmly set on the bunks and bound tightly down with chain or cable so it cannot work loose. In trucking enough weight should be on front wheels to give good steering.
4. Keep load on trucks to what the truck will bear. Overloading is common in hauling logs and on easy roads an excess load can often be handled without damage or too much wear. On poor or hilly roads overloading is a safe bet for big trouble.



Don't Overload

PART XIMARKETING FOREST PRODUCTS

At present most farm woodlands are valuable only for the fuel, posts, rough lumber and other minor products they give for home use. With your



Regular Cash Income From The  
Well Managed Farm Woods

woods under management you will be getting regular cash income from your woodland in addition to the material for your own use. This brings to you the problem of marketing your forest products to good advantage. Even now the problem is an important one to many farmers.

The following suggestions may be helpful to you if you have timber or products for sale and want to get the most for them and at the same time see that your woodland is not damaged by logging:

Such information must be taken with caution. The fact that several people have dealt with a buyer does not guarantee that they have made good deals. Further a man who has made a bad bargain will not like to talk about it or he may not know whether his bargain was good or not.

2. Inquire of the State Forester or Extension Forester—your Farm Security Supervisor or County Agent will help you do this. Many states



Get Bids From Several Buyers

have good marketing services and will furnish lists of buyers and quotations on timber and lumber prices. Some are able to furnish advice and assistance to the private woodland owner free or at very little cost.

3. Get the services of an experienced forester or lumberman who can make an exact survey and evaluation of the timber and give help in dealing with buyers and making contracts. There are many such men of wide experience and the cost of their services is small when compared to the savings they may be able to make.

4. Get in touch with several possible buyers and mill operators both local and outside your county. Get their bids. This will get the benefit of competition and a little of this often brings the prices on timber or logs into line.

5. Figure the value of the timber by taking the market price of the product and subtracting the total costs of putting it on the market. For example, good clean seasoned hardwood fuel may be selling for \$7.50 per cord in town and it is figured that it costs \$3.25 to cut and pile, \$2.00 to load and haul and allow .75 per cord for profit. Then the total cost is \$6.00 and this from \$7.50 gives \$1.50 as stumpage.

6. Insist on a contract or written agreement in all cases whether you are selling products or stumpage.

7. Remember that during the war the high prices and good markets offer a strong temptation to cash in on the young immature timber. The situation may justify your selling somewhat smaller size material than would normally be advisable but no matter how high prices go you will find it poor economy in the long run to clear cut or to cut so heavily that the woodland will not restock to good trees.

8. If you have a mortgage on your farm get permission from the holder to cut and sell.

### When to Sell

It is often a problem to know whether it is best to sell timber on the market or use it on the farm. There are many cases where farmers have made quite large savings in putting up a barn or other building with lumber cut on the place. But there are also many instances where the building was made out of valuable oak or poplar which it would have been better to sell on the market. Part of the money could then be used to buy pine or hemlock which would be good enough for the purpose. The oak and poplar are too good and there is no economy in using them.

If you are a woodland owner you should not be too much worried about the statements of buyers which often sound like this: "I've got to have that timber right away to keep my mill going or I'll have to move to the other side of the county and won't be able to buy your timber at all". "Your timber is old and getting rotten. If you wait you will find it so rotten in 5 years, it won't be worth anything." "We have heavy ice this year for hauling" or "The hardwood swamp is dry this year" and "This may be the only chance for several years to get the timber out so you had better sell."

These arguments are, of course, sometimes true but too often they are simply the natural conversation of the buyer whose business it is to get what he needs as cheaply as possible. Even though you may have to give up a sale for several years, it may be better to do this than sell timber for much less than it is worth. The mill or another comes back or perhaps a better and more permanent industry sets up; timber does decay but often not as rapidly as buyers seem to think. As for the "hard freeze" or the "dry swamp", the farmer is probably a better judge of such matters than the buyer.

As for the time of year to sell, the winter is usually the best except in those sections in the south where the ground does not freeze. Here the summer or early fall when the ground is hardest makes for easy logging but the timber will be better if cut in the winter when the "sap is down". Further, the winter time will usually find you least pressed with other

work and best able to work in the woods. And to repeat--do not sell immature timber except that taken out to improve the remaining trees. Read again the first part of Part III.

### How to Sell

It is by all odds best for you to cut or harvest your own timber in the form of rough products. This gets for you not only stumpage but a return on your labor and on your team or truck. Other crops, corn, wheat and potatoes, for example, are marketed this way and it should not seem strange to market the timber crop in the same manner. This not only means a larger income but it helps more than anything else to see that the woods are left in good condition for growing another timber crop.

When logs, cord wood or piece products are sold by the farmer he will usually know beforehand what he can sell and what he will get for it. By knowing what it costs him to produce it he can by subtraction figure what he is getting for stumpage and can then decide if this is sufficient. The chances are he will estimate this before he begins.

### Types of Sales

There are four general methods of selling timber. Many variations of these four methods are in use but, generally speaking, they may be grouped as:

1. Selling by Count. Cordwood, pulpwood, poles, piling, cross ties, etc. are sold by count of the units, pieces, or cords. This method is simple and easy to use.
2. A lump-sum sale of all the standing timber above a specified size for a definite price. This is usually bad practice. If you have a good estimate and a watertight contract it will be satisfactory.
3. A log-scale sale based on the number of thousand feet of logs or cords of wood cut, as measured by a certain scale, and at an agreed price per thousand board feet. This is an excellent method if the scale is known to be fair and honest.
4. A lumber-tally sale based upon an agreed price per thousand board feet of lumber cut at the mill. The log-scale and lumber-tally methods outlined above are less convenient to the seller because, unless the buyer is known to be absolutely honest and reliable, the seller must provide for constant checking on the amount of logs or lumber removed from his timber tract.

### Timber Sale Contracts

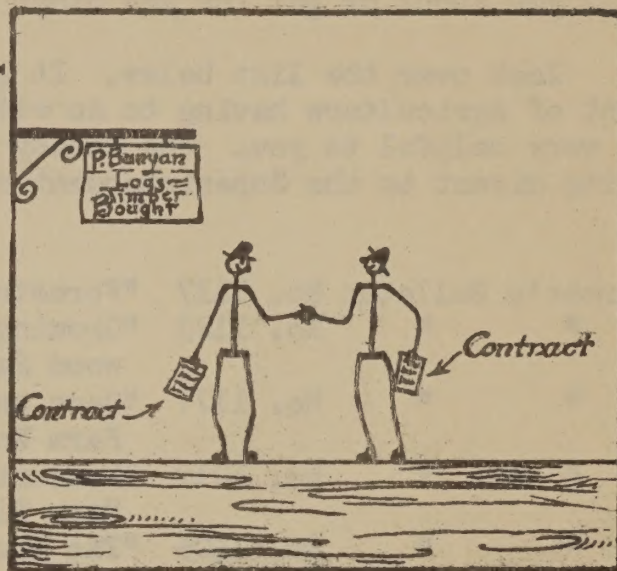
Every sale of timber or other forest product should be covered by a written agreement. It should be signed by the seller, the buyer, and at least one witness. This is just good business practice and helps avoid misunderstandings.

No contract, regardless of how carefully drawn, is any better than the honesty and good intentions of the men who sign it. However, a sensible contract which both parties understand and agree to will help in avoiding

difficulties that are apt to arise in a verbal agreement covering a complicated timber sale.

Regardless of the size of the timber sale, the following information should be included in a written agreement for the best interests of all parties concerned:

1. Names and addresses of contracting parties and witnesses.
2. Date and place contract was signed.
3. Guarantee of ownership of timber, payment of taxes and other fixed charges, and right of ingress and egress.
4. Location and description of products sold.
5. Method of measurement to be used to determine volume of products sold.
6. Method of payment, including rate per unit, time, place and in what amounts.
7. Restrictions regarding cutting, logging, milling, and removal of products from the property, including time limit and provision for extensions.
8. Penalties for damages or contract violation.
9. Use restrictions on contract and other areas.
10. Provision for fire prevention and control.
11. Performance bond or guarantee of compliance.
12. Method of adjustment of disputes or disagreements.



Every Timber Sale Should Be Covered by a Written Agreement.

It is always advisable to have any written agreement covering sales of substantial amounts of timber drawn up or examined by an attorney and placed on public record.

### SUGGESTIONS FOR READING

We have tried to tell you in this bulletin some of the more important things about managing a farm woodland. There is much which could not be included. You may want to know more about some things than you find here. Get in touch with your County Agent or Farm Security Supervisor who will tell you about or get for you other useful publications.

Look over the list below. It gives the Bulletins of the U. S. Department of Agriculture having to do with farm forestry. These Bulletins will be very helpful to you. The County Agent can get these for you or you can write direct to the Superintendent of Documents — Washington, D. C.

Farmer's Bulletin	No. 1117	"Forestry and Farm Income	Price	5 cents
"	"	No. 1123 "Growing and Planting Hard-	"	
		wood Seedlings on the Farm"	"	5 cents
"	"	No. 1177 "Care and Improvement of the	"	
		Farm Woods"	"	5 cents
"	"	No. 1210 "Measuring and Marketing	"	
		Farm Timber"	"	10 cents
"	"	No. 1405 "The Windbreak as a Farm Asset"	"	5 cents
"	"	No. 1453 "Growing and Planting Con-	"	
		iferous Trees on the Farm"	"	5 cents
"	"	No. 1628 "Growing Black Locust Trees"	"	5 cents
"	"	No. 1794 "Forest Farming"	"	5 cents
"	"	No. 144 "The Preservative Treatment of	"	
		Farm Timbers"	"	5 cents
Leaflet 29	"The Farm Woods—A Savings Bank Paying Interest"		Price	5 cents
Leaflet 86	"Protect Hardwood Stands from Grazing"		"	5 cents

Your Extension Forester can furnish you with many different bulletins and instructions which apply directly to your local woodland problems. You will be well repaid by reading and using them.



